

# **NAVAL INSTITUTE for DENTAL and BIOMEDICAL RESEARCH**



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***Reducing  
Musculoskeletal  
Injuries in  
Navy Basic  
Training***

# RECENT HISTORY



# ***Fitness/Injury Management Triad***



- **Training Policy**
- **Environmental Factors**
- **Physiological Variables**

# Training

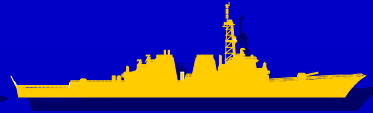


-Marching

-Road Guard Duty

-Boots/Running

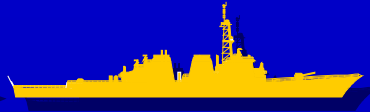
- 
- Base line fitness assessment
  - Standardized Fitness Training



# ***Standardized Physical Training***

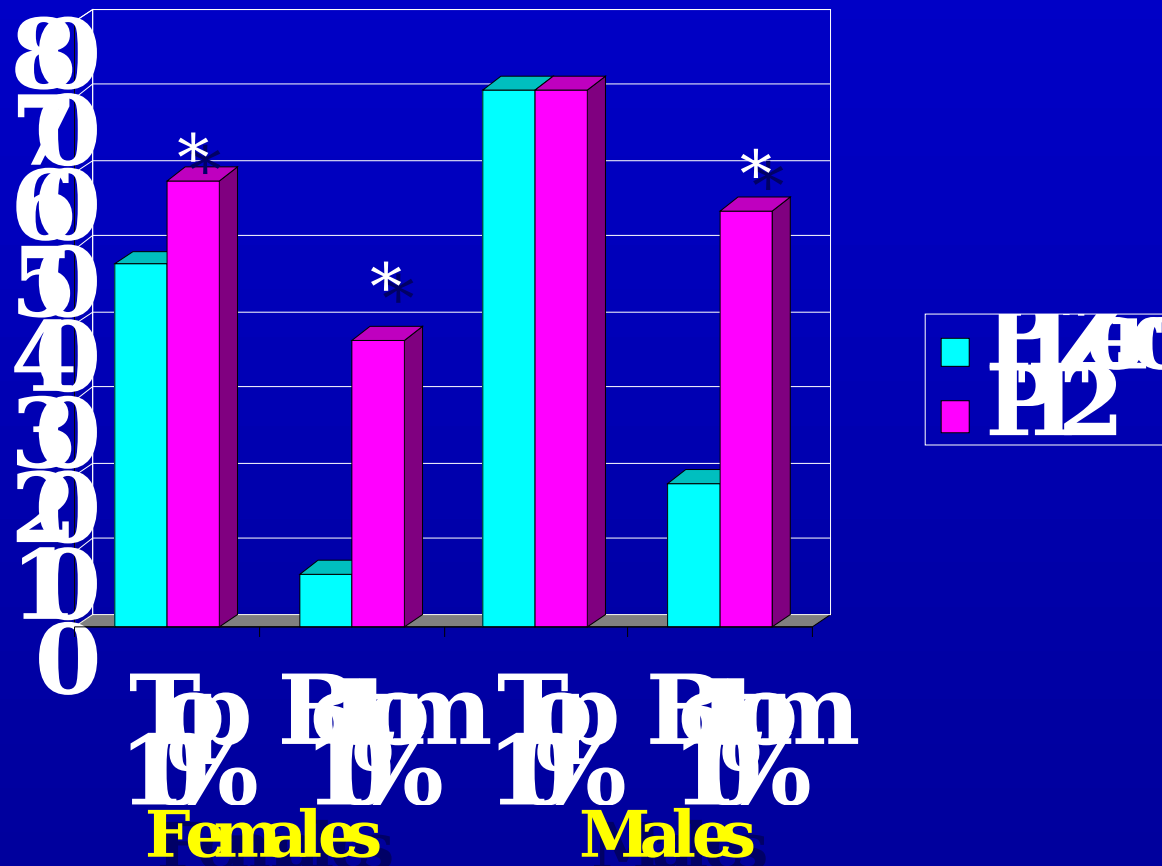
**Will it produce  
positive results for all  
who participate?**

# *Program Evaluation*



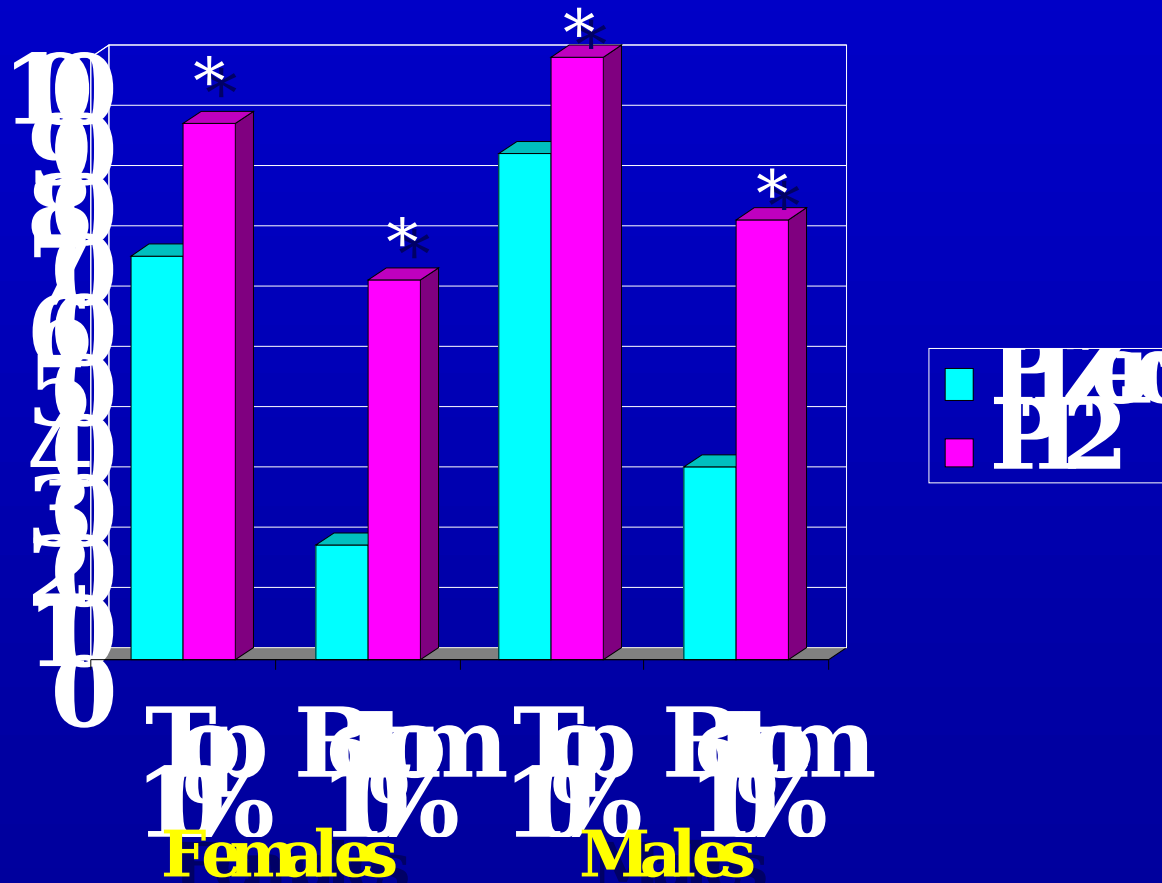
- **n=2353 (32 divisions)**
- **Fitness changes**
- **Divisional assignment to the Physical Fitness Training Unit**
- **Divisional success rate**
- **\*\*criteria for success during data collection was a score of 'Good Low'**

# PUSH-UP SCORES



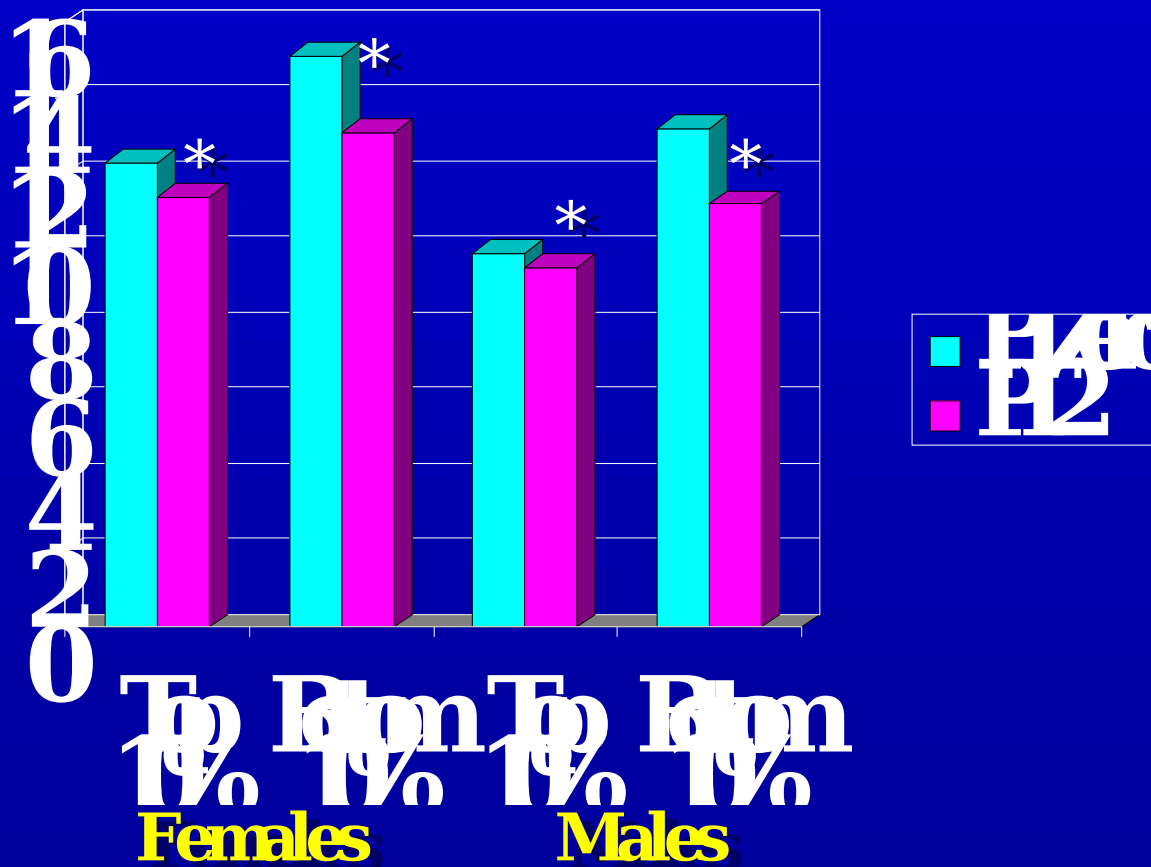
\* significant improvements (P<001)

# SIT-UP SCORES



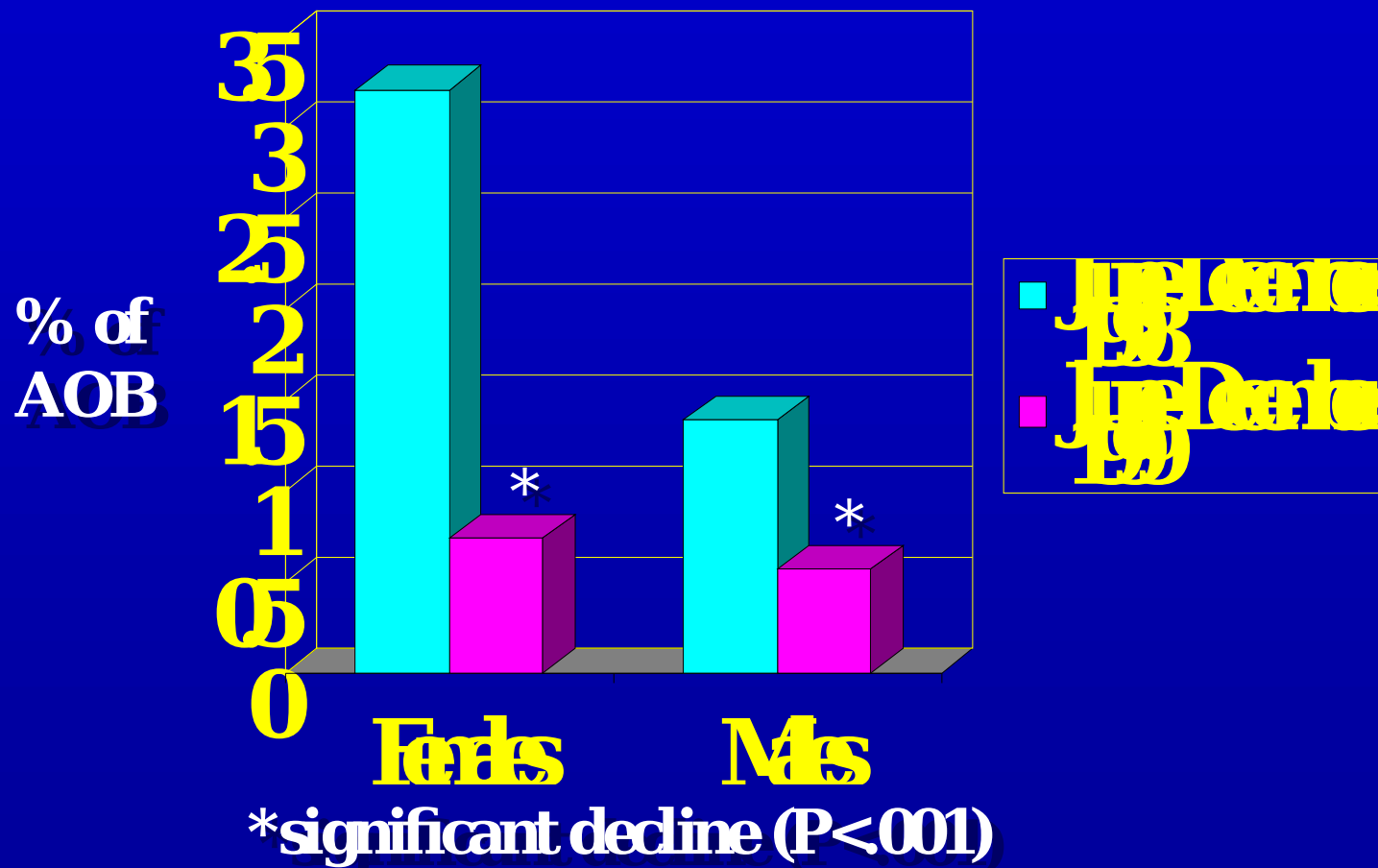
\*significant improvements (P<001)

# RUNTIMES

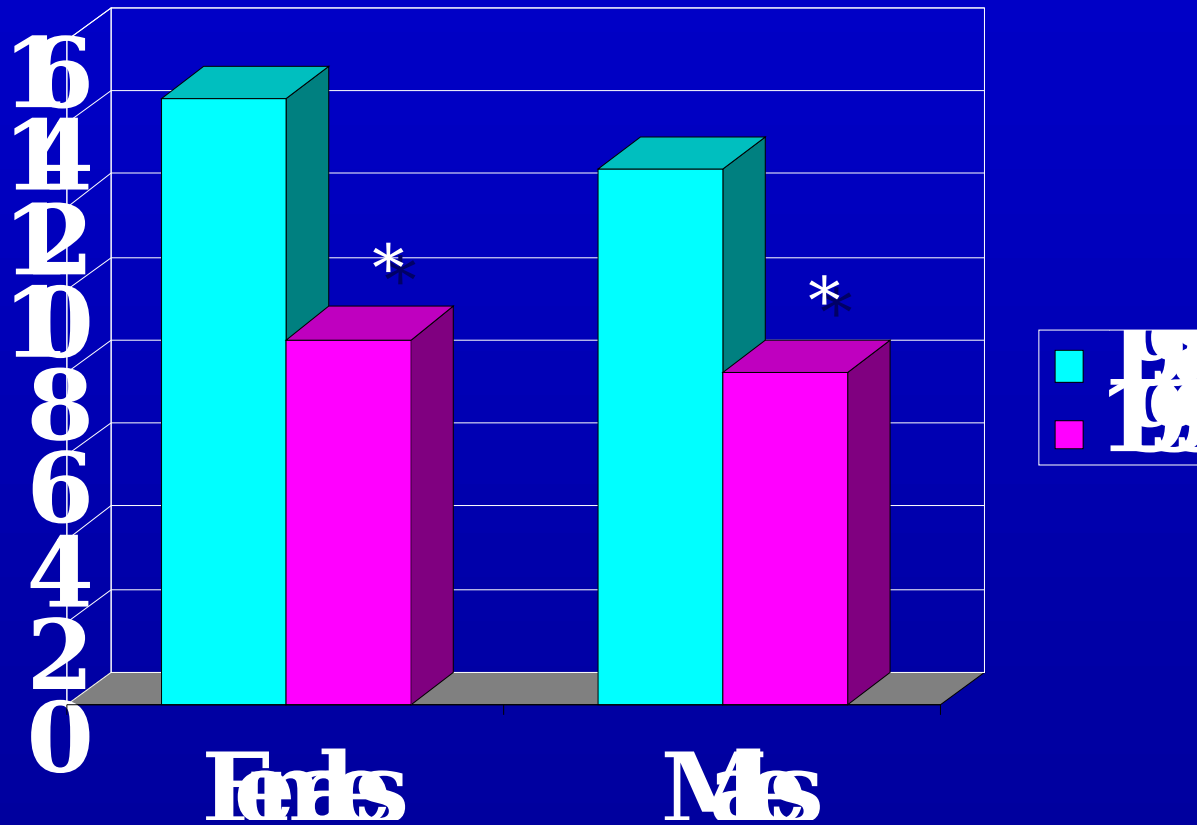


\* significant improvements ( $P < 0.001$ )

# PFTU ASSIGNMENT



# Average stay-time in PFTU



\*significant decline ( $P < 0.01$ )



# Environmental

A wide-angle photograph of a large indoor sports facility. The floor is a polished wooden basketball court with blue boundary lines. Several tall, white pillars with blue padding at the base are spaced across the room. In the background, there are basketball hoops and a few people playing. The ceiling is high with a complex steel truss structure and many bright lights.

**Flooring**

**Running Shoes**

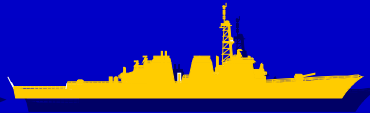
**Boots**



# ***Boots***

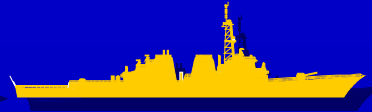
**One contributor of  
overuse  
musculoskeletal  
injuries in recruits**

# ***Recent History***



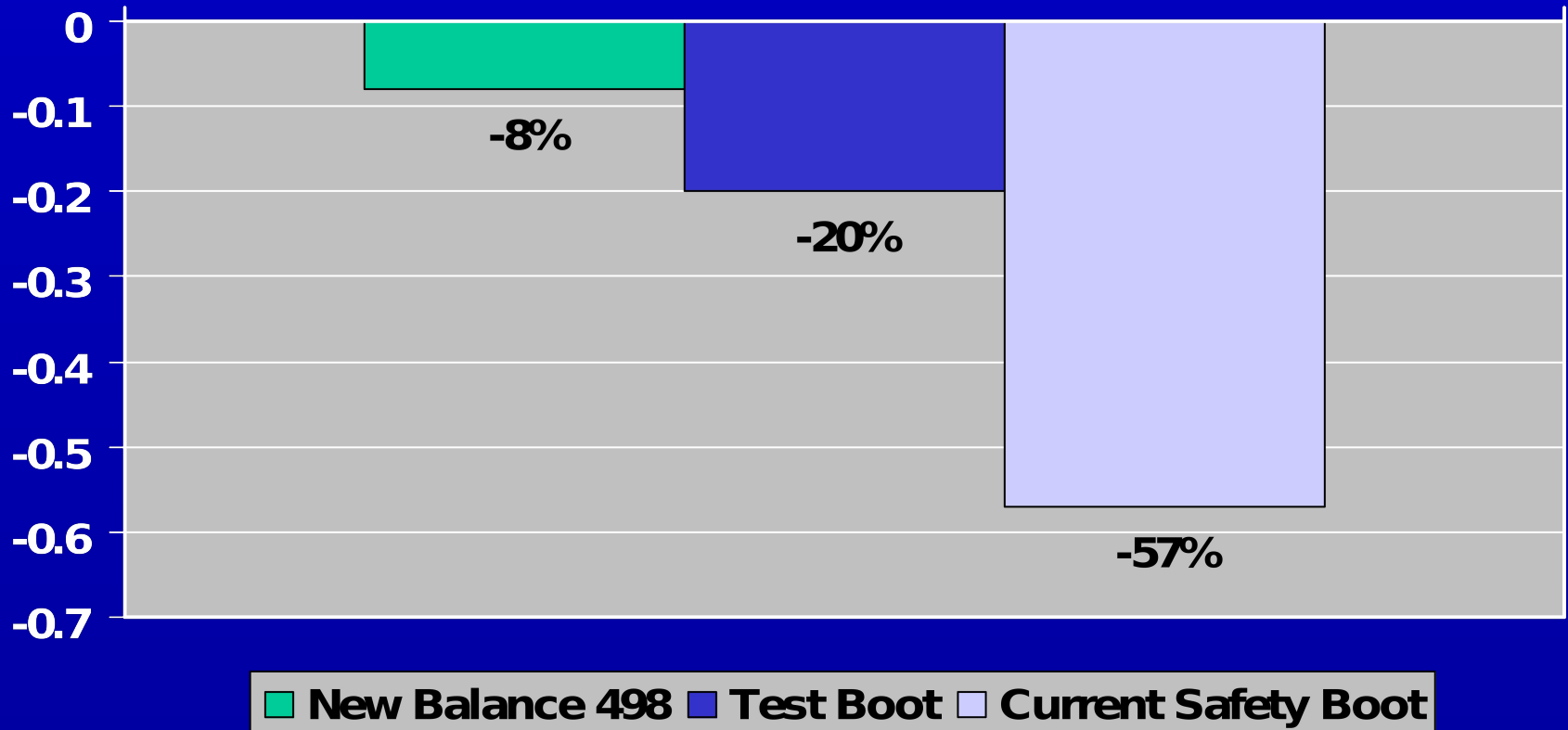
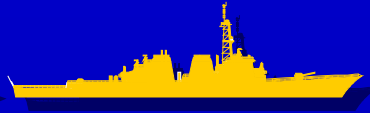
- **Prior to 1996, issue boots were constructed using a man's "last"**
- **1996: boots were updated and constructed with both a man's and woman's "last"**
- **1999: Recommended to CNTC to evaluate recruits footwear**
- **2001: Footwear issue revisited. Evaluation funded**

# ***Training Boot Study***

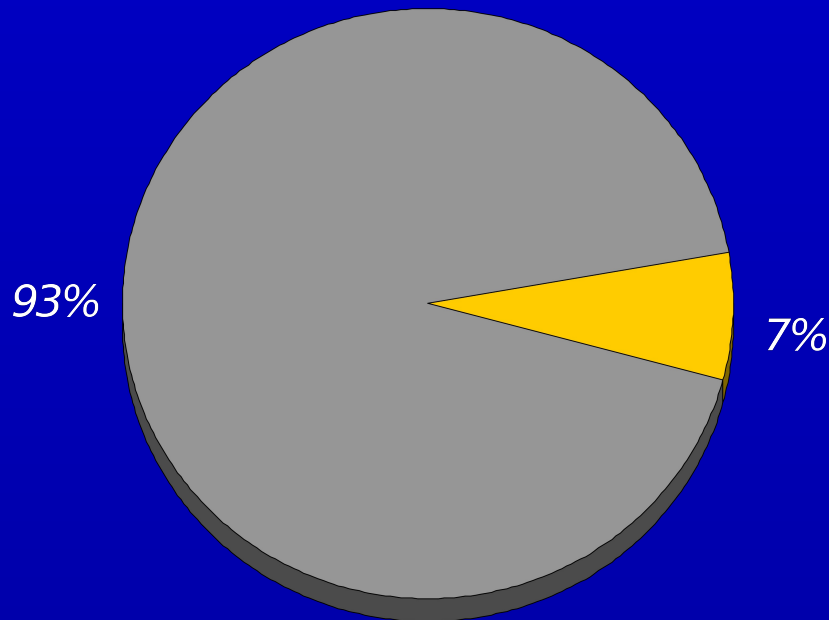
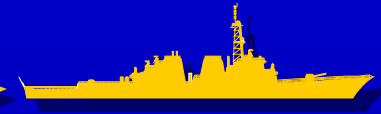


- **Objective:** determine the efficacy of training in a boot with a softer sole.
- **Method:** 1548 female recruits followed. Injury data compared to 635 female recruits who trained in the safety boot.

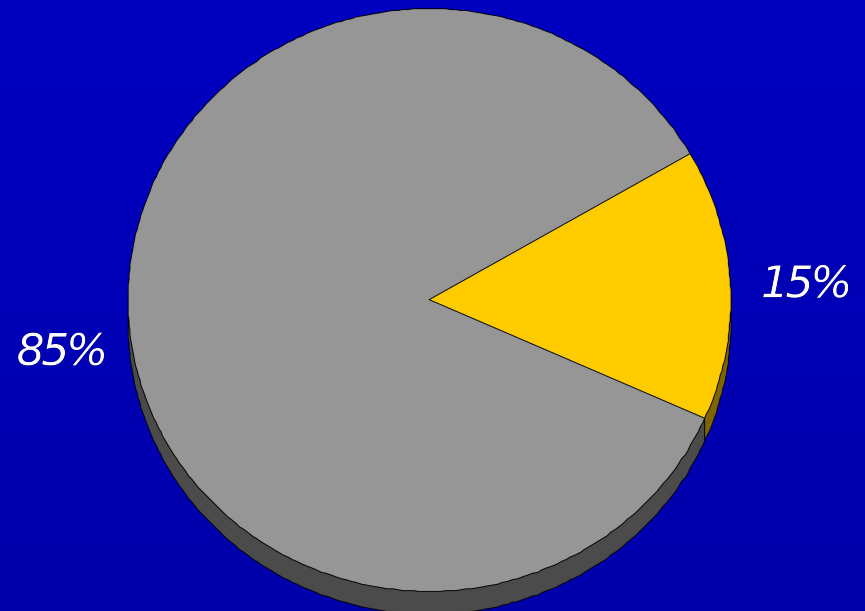
# Shock Absorbency Comparison to Proposed Boot



# Lower Extremity Injury Comparison



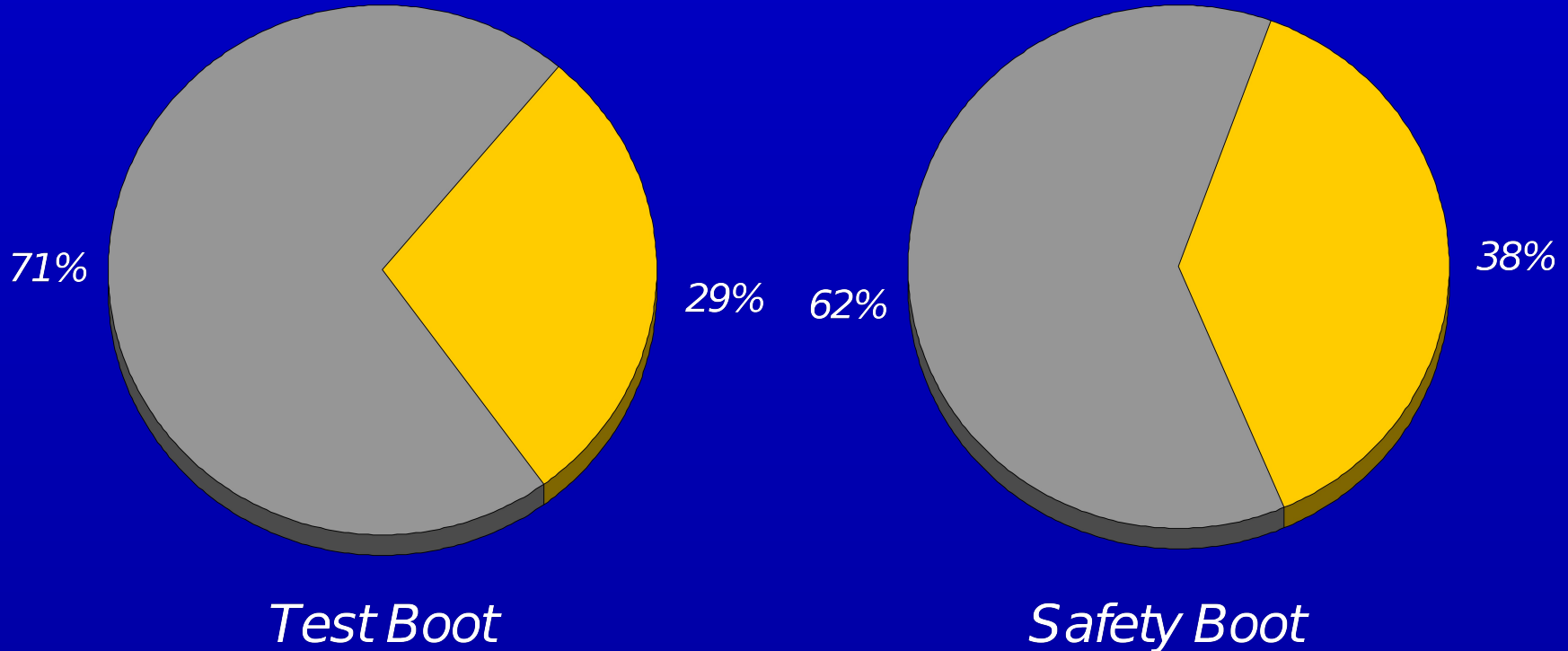
*Test Boot*



*Safety Boot*

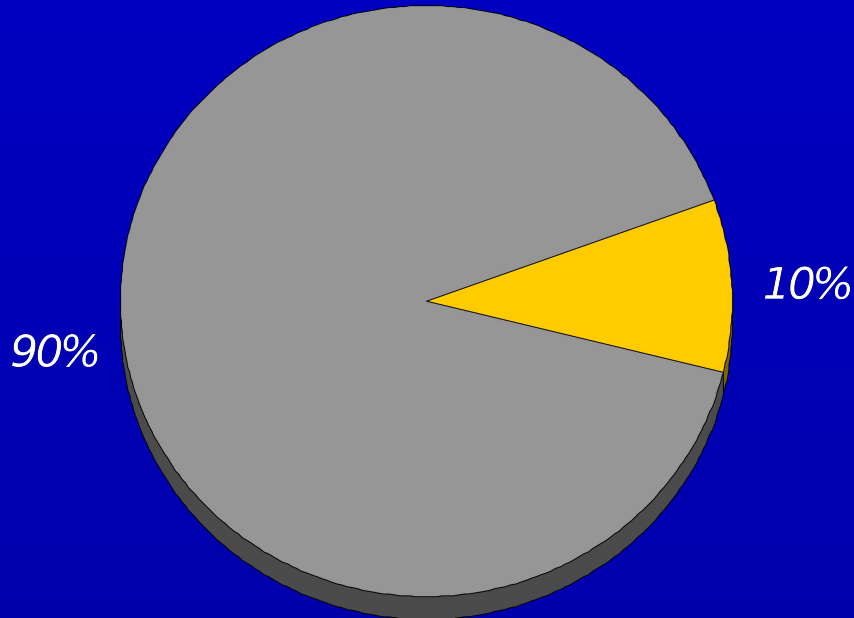
**The proportion of female recruits who wore test boots and sustained an overuse injury is statistically lower than those who wore the safety boots and sustained injury ( $p < 0.001$  Chi-square)**

# **Foot Injuries** (metatarsal stress fractures and blisters)

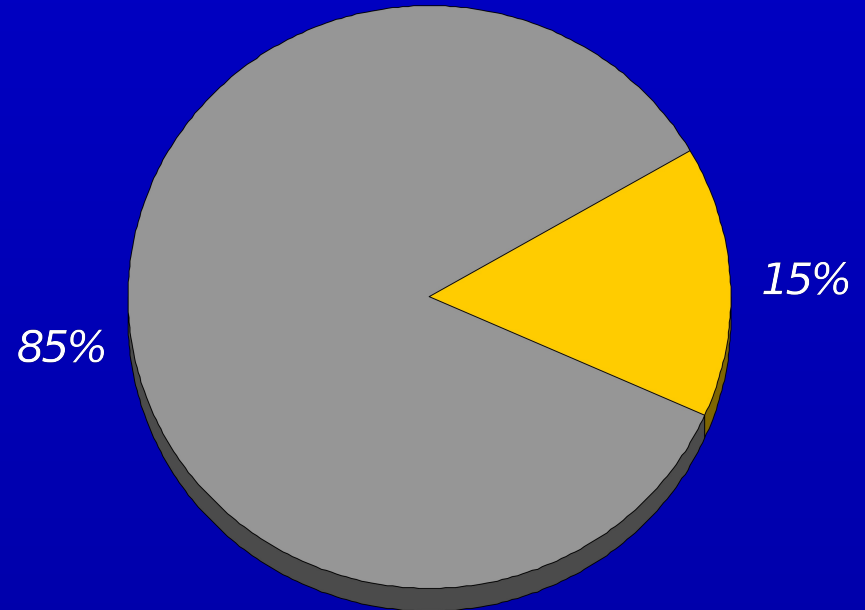


**The proportion of foot injuries among female recruits who wore the test boots is statistically lower than those who wore the safety boots ( $p=0.05$  Chi-square)**

# ***Stress Fracture Comparison***



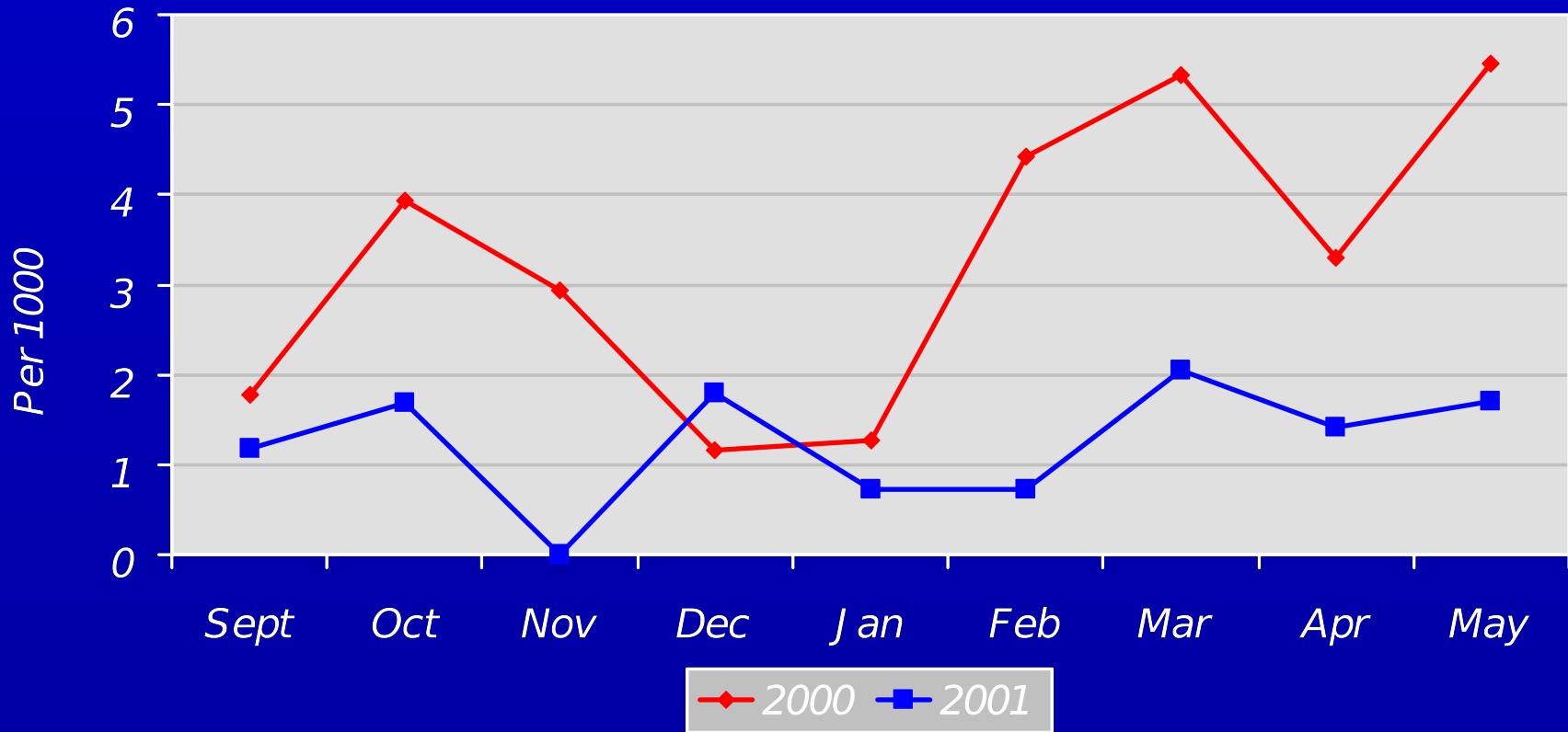
*Test Boot*



*Safety Boot*

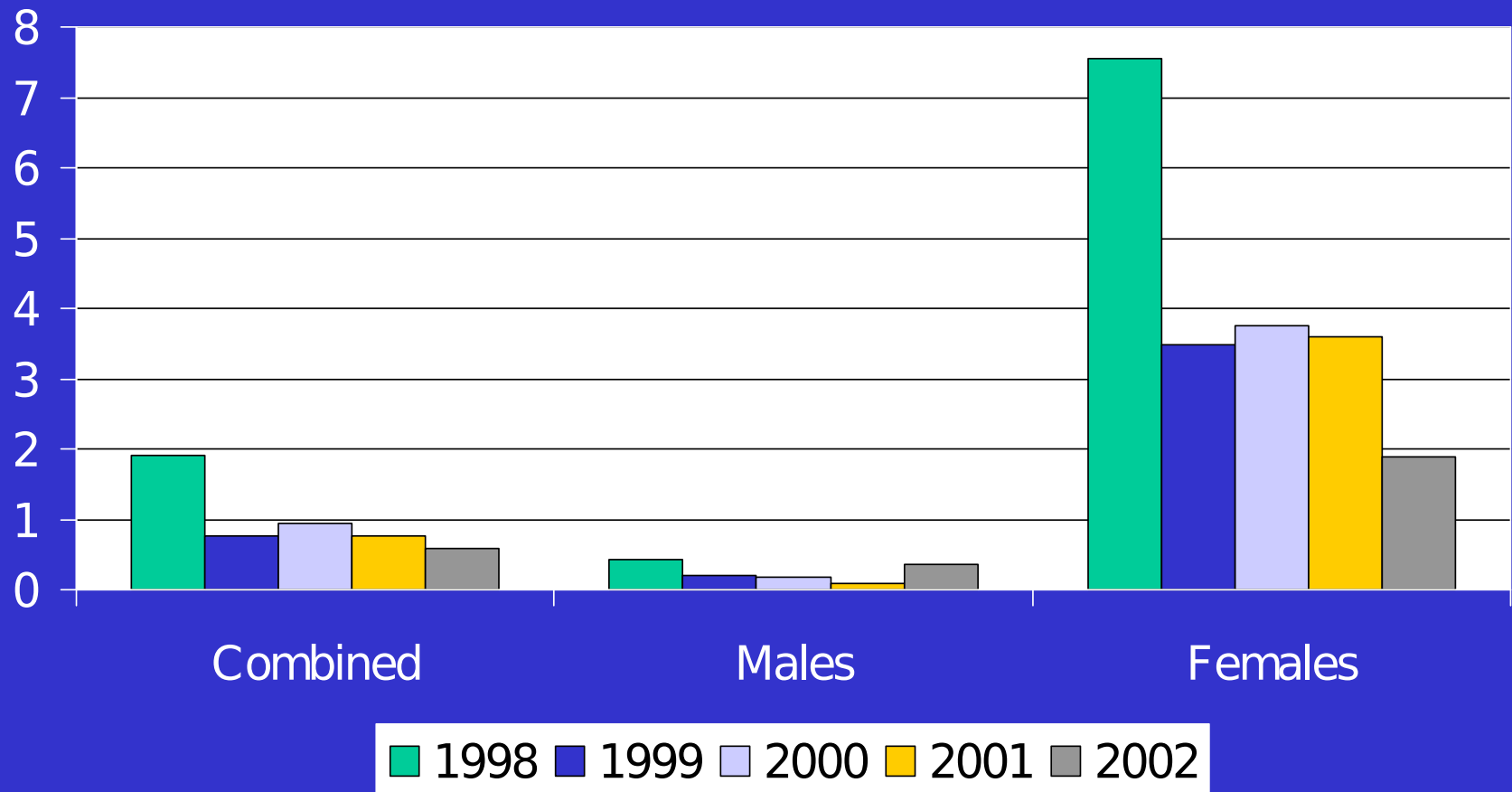
**Comparison of proportion of stress fractures to all other types of overuse injuries between the test boot group and the safety boot group**

# Female Severe Stress Fracture Rates



**Comparison of fracture rates with footwear that provides at least 32% more shock absorbing characteristics ( $p=0.008$  ANOVA)**

# ***Average Annual Severe Stress Fracture Rates Per 1000 Recruits***



**Rates for 1999-2003 are statistically lower than 1998.  $p < 0.05$**

A photograph of two students, a young woman and a young man, sitting on a grey mat on a dark gym floor. They are both wearing white t-shirts and dark shorts. The woman is on the left, looking towards the man on the right. They appear to be in conversation. In the background, there is a large stainless steel machine, a sink, a window, and a cabinet. A blue bucket is on top of the cabinet. A green bench with black bags is on the right. The text 'Physiological - the road ahead' is overlaid at the bottom.

**Physiological - the road ahead**